

REMARKS

Reconsideration of the application is requested.

Claims 9-28 were pending as of the mailing of the Office Action on April 14, 2010. Applicant presents herein certain amendments in response to the current Office Action.

Applicant has made certain amendments herein.

Applicant respectfully asserts the claim amendments are found in the specification as filed.

The basis for the claim amendment:

providing the feed gas mixture originating from a biomass gassification process, the feed gas mixture including carbon monoxide, hydrogen, water vapor, C₂ components and aromatic hydrocarbons ; the aromatic hydrocarbons being in the range of less than 10 vol %;

can be found in the original specification on page 3, lines 10 to 14 in combination with the limitation in the originally filed claims 9 and 13.

The basis for the limitation “without a pre-treatment in an activated carbon filter” is given in the original specification on page 6, lines 6 to 13, and on page 7, lines 10 to 19. In both examples given at these passages, labelled as Phase 2 and Phase 3, the activated carbon filter has been removed from the gas feed line.

Claim 9 has the limitation of the content of aromatic hydrocarbons as to what was the preferred amount of this content.

Applicant represents and asserts that no new matter is added by any of these amendments.

I. REJECTIONS UNDER 35 USC 112

The current Office Action, beginning on page 2, item 2, sets forth several rejections under 35 USC 112.

The Office Action, on page 2, items 2-3, has rejected claims 9-28 under 35 USC 112. The Action has determined the concentration values are indefinite because they are without units. Applicant respectfully traverses this. Concentration values are commonly set forth as a ration of one concentration to another. It is well known that each component of the comparison have the same units of measurement and the units cancel when concentration is expressed as a fraction. Applicant has amended claim 9 to more clearly define a concentration of H₂/CO in the initial gas mixture in the range of 0.25 to 5 when the feed gas is brought into contact with the fluidized bed catalyst. Applicant asserts the claim as presented satisfies the definiteness requirement of 35 USC 112.

Applicant respectfully requests reconsideration and withdrawal of this rejection.

The current Office Action, on page 2, item 4, has rejected claims 9-28 under 35 USC 112 based on the recitation of “the feed gas further comprising unsaturated C₂ components and aromatic hydrocarbons in the range of 1 to 10 vol %”

Applicant has amended claim 9 to more distinctly claim “the aromatic hydrocarbons being in the range of less than 10 vol %” distinctly claiming the aromatic hydrocarbon concentration in the feed gas. Applicant asserts the claim as presented satisfies the definiteness requirement of 35 USC 112.

Applicant respectfully requests reconsideration and withdrawal of this rejection.

Claim 11 has been rejected under 35 USC 112 as set forth in item 5 of the current Office Action. Applicant has amended claim 11 to recite the catalytic active

component is a mixture of nickel and nickel oxide. This claim further limits claim 10 and Applicant asserts is within the requirements of 35 USC 112.

Claim 21 has been rejected under 35 USC 112 as set forth in item 6 of the current Office Action. Applicant has amended claim 21 to recite the gas further contains at least one of benzene, toluene or naphthalene in the range of less than 5 vol % based on the overall volume of the feed gas. This claim further limits claim 9 and Applicant asserts is within the requirements of 35 USC 112.

Claim 22 has been rejected under 35 USC 112 as set forth in item 7 of the current Office Action. Applicant has amended claim 22 to recite the feed gas is in the range of 1 to 5 vol % based on the overall volume of the feed gas and the fluidized bed catalyst. This claim further limits claim 9 and Applicant asserts is within the requirements of 35 USC 112.

II. REJECTIONS UNDER 35 USC 103(a)

The current Office Action has set forth several rejections under 35 USC 103(a). Applicant will address each rejection below.

A. STATEMENT OF COMMON OWNERSHIP

Applicant acknowledges the requirement under 37 CFR 1.56 relating to common ownership of the claimed subject matter. Applicant affirms the understanding set forth on page 4, item 10 of the current Office Action that subject matter of the claims was commonly owned at the time the inventions were made.

B. REJECTION OF CLAIMS 9-20 and 22-28

The Office Action, on page 4, items 11-13, has rejected claims 9-20 and 22-28 as being unpatentable over U.S. Pat. No. 3,928,000 to Child in view of U.S. Pat. No. 3,912,775 to Broecker.

Applicant respectfully traverses this rejection.

Claim 9 of the subject application now claims, inter alia:

providing the feed gas mixture originating from a biomass gassification process, the feed gas mixture including carbon monoxide, hydrogen, water vapor, C₂ components and aromatic hydrocarbons; the aromatic hydrocarbons being in the range of less than 10 vol %;

bringing the feed gas mixture, without a pretreatment in an activated carbon filter, into contact with a fluidized bed catalyst having catalyst particles having a catalytic active component including at least one of a metal, a metal compound or a mixture thereof (currently amended claim 1, emphasis added).

The subject invention provides a process having sustainable and stable conversion of harmful aromatic hydrocarbons and an enduring and stable generation of methane although an activated carbon filter is absent upstream of the fluidized bed reactor. This claim feature is not found in the patent of scientific literature.

Applicant references the declaration under 37 CFR 1.132 of Dr. Serge Biollaz submitted herewith unsigned. The signed declaration will be submitted as soon as counsel has received it.

Dr. Biollaz evaluated the cited references, the current Office Action, and the claims of the subject application. Each reference is initially discussed separately and then the deficiencies of the combined teaching are discussed.

Dr. Biollaz has declared:

Summarizing the experimental results, it has to be pointed out that the process according to the new claim 9 delivers both a sustainable and stable conversion of harmful aromatic hydrocarbons and an enduring and stable generation of methane although an activated carbon filter is absent upstream of the fluidized bed reactor. This result is the surprising teaching of the present invention which turns out to be operational on a long-term scale with a lower input of both fresh activated carbon (which is completely absent) and fresh catalyst material.

Child et al. (U.S. Pat No.3,928,000) discloses a methanation process where the raw gas is originating from coal or coke under very specific conditions with respect to the removal of carbon monoxide. The raw gas generated from coal does contain usually a significant amount of sulphur components but does not contain higher hydrocarbons and aromatic hydrocarbon as compared to the feed gas mixture given in claim 9. In addition, the teaching according to Child does not comprise the use of a fluidized bed catalyst as given of the amended claim 9.

Broeker et al. (US 3,912,775) discloses a process for the generation of methane using feedstocks as disclosed in column 4, lines 29 to 36, and in column 11, lines 60 to 66. These feedstocks are specific for the steam reforming process and rich gas process. In this point, the examiner fails to cope with the present claim language since the feedstock of Broeker et al. for this steam cracking of hydrocarbons consists to 100% of mixtures of hydrocarbons of average C number from C₁ to C₃₀, predominantly paraffinic hydrocarbons, but also aromatic hydrocarbons and naphthenic hydrocarbons. Therefore, the feedstock of Broeker is completely different from the feedstock used in our invention according to feature a) of the amended claim 1. The rich gases for the methanization of Broeker et al.,

i.e. mentioned in column 4, lines 41 to 54, from low temperature cracking of naphtha in general already contain, after drying, 50 to 75% methane, 19 to 25% of carbon dioxide, up to 16% of hydrogen and up to 5% of carbon monoxide. Broeker et al. further discloses that these gases now can pass over a nickel catalyst, using preheating temperatures from 200 to 300°C, without causing coking of the catalyst. At that stage, we have to point out that the feed gas of Broeker et al. which is passed to the methanization catalyst **is completely free** of C₂ components and aromatic hydrocarbons which is in contradiction to the composition of the feed gas according to the present invention.

In particular, the coking of the catalyst is already known by Broeker et al. when passing C₂ components and aromatic hydrocarbons over the methanization catalyst. Therefore, Broeker et al. has a two-stage process: Starting with the cracking of a feedstock that may comprise C₂ components and aromatic hydrocarbons to receive a feed gas for the subsequent methanization process that is completely free of any C₂ components and aromatic hydrocarbons and then the methanization step with this feed gas being completely free of C₂ components and aromatic hydrocarbons (see for example column 9, lines 43 to 46, column 10, lines 24 to 26, lines 47 to 51). To the contrary, in our invention, **C₂ and aromatic hydrocarbons must be present** in the composition of the feed gas used in the methanization step.

Therefore, even a combination of Child et al. and Broeker et al. can not lead to the present invention according to the amended claim 9 now presented. Both, Child et al. and Broeker et al. teach that the feed gas delivered to the methanization step is completely free of C₂ components and aromatic hydrocarbons. Broeker et al. only teaches the use of a feedstock for the steam cracking of hydrocarbons consisting in example 8 (column 11, lines 61 to 63) of 88% by volume of paraffins, 10 percent by

volume of naphthenes with 6-membered rings and 2% by volume of aromatics. The composition of this feedstock has absolutely nothing in common with the composition of the feed gas we use in the methanization step as claimed in claim 9.

Thus, the combined teaching of the Child and Broecker references not only fail to teach or suggest the claims of the present invention, but by teaching a requirement of a pretreatment in an activated carbon filter and a methanization process that is completely free of any C₂, the combined disclosure of Child and Broecker teaches away from the subject invention.

Applicant respectfully reminds the Office the in order to use a reference as prior art, the MPEP 2141.02 and applicable case law provide "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983).

Based on the analysis set forth herein, and the Declaration of Dr. Biollaz, Applicant asserts the cited references of Child and Broecker teach away from the present invention and cannot be used to support a rejection under 35 USC 103(a).

Applicant respectfully requests reconsideration and withdrawal of this rejection.

C. REJECTION OF CLAIM 21

The Office Action, on page 6, item 14, has rejected claim 21 as being unpatentable over the Child and Broecker references of record and further in view of U.S. Pat. No. 3,838,994 to Aldridge.

Applicant respectfully traverses this rejection.

Claim 21 depends on claim 9. As set forth above in sec. II(B), the subject invention is not obvious in view of the references of record. Combination of the Child and Broecker references with Aldridge fails to cure the deficiencies in the references as set forth in sec. II(B).

According to the disclosure of Aldridge, the methanization process is carried out at an average temperature between 1000° and 1500°F (537° and 816°C). According to feature claim 9 of the present invention, the claimed temperature ranges from 250 to 500°C which is clearly below the range of Aldridge. Applicant respectfully points out that the Aldridge teaching is disadvantageous in providing conditions that are responsible for the production of undesirable C₂+ content Aldridge received for all of his product gases (see column 6, line 67, column 7, line 53, column 8, line 34, column 9, line 20). According to the measurements when working along the present invention, as established in the attached declaration and the current specification, the C₂ components and aromatic hydrocarbons are completely consumed during the methanization step which is an unexpected result in view of the Aldridge teaching having C₂+ components in the product gas although using higher temperatures.

Because of the failure of the combined Child, Broecker, and Aldridge references to teach, suggest, or provide any motivation to modify, Applicant asserts an obviousness rejection cannot be maintained.

Applicant respectfully requests reconsideration and withdrawal of this rejection.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of \$130.00 in accordance with Section 1.17 is enclosed herewith.

Application No. 10/589,158
Amendment dated 8/16/10
Reply to Office action of 4/14/10

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to Deposit Account Number 12-1099 of Lerner Greenberg Sterner LLP.

Respectfully submitted,

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